

ASD Weekly Highlights for the Week Ending 1-Sep-2006

Operations

Operating Statistics 28-Aug to 03-Sep

Recorded Activity Type	Hours	% of Total
Beam Time to Extraction Dump	5.50	3.64
Beam Time to Injection Dump	21.70	14.37
Beam Time to Linac Dump	14.70	9.74
Beam Time	41.90	
Machine Startup (from a Planned Shutdown)	1.50	0.99
Machine Studies (R&D)	11.40	7.55
Planned Shutdown (no Beam, no Testing)	81.70	54.11
Testing (Machine on, no Beam, e.g. RF Processing)	14.50	9.60

Total Activity Recorded	151.00	
Total Planned Beam Time	41.90	0.71
Total Downtime Recorded	17.00	0.29

Downtime by Group, Subgroup

Category	Sub Category	Hours	Notes
Accelerator Physics	Application Programs	0.30	Mode not appropriate for magnets being ramped
Controls	ICS Computer Systems (OPIs and servers)	1.90	Fe_Ctl:IOC2 block transfer error sent a zero setpoint to RFQ chiller #1
Cooling Systems	RCCS	0.30	P-KL-4 Switched to secondary pump
Electrical Systems	Power Supplies	2.30	HEBT QV11 ps. replaced the voltage monitor and regulation board
Electrical	Power Supplies	1.80	injection kicker H02 supply

Systems			
Facilities - Site	Electrical Distribution	1.50	Lightning Strike
Machine Protection System	Fast Protect - Latched	1	MPS SCL QD07 Chassis
Mechanical Systems	Stripper Foil Actuator	3.50	Ring Scraper B10b fault
Mechanical Systems	Stripper Foil Actuator	1.50	ring collimator B10b had a loose wire in the enable circuit for the scraper motor drive
Protection Systems	Radiation Monitors	1	400 Series Chipmunks loss of power
RF Systems	HPRF	1	IOC Reboot and RF recovery
RF Systems	MEBT RF	0.30	MEBT4 recovery after Fe_Ctl:IOC2 reboot
Vacuum	Vacuum Pumps and Controllers	0.50	RTBT SGV_12 closure due to the problem with controllers of several RTBT IPs
Vacuum	Vacuum Valves	0.10	Zone 8 SGV valves closed due to lightning strikes twice

Accelerator Physics

- The injection dump is designed to transmit H- beam that misses the primary stripper foil, and H0 beam that is partially stripped by the foil. On Aug. 30 we were able, for the first time, to transmit both H- beam and simulated H0 beam to the injection dump without changing any magnets other than those needed to simulate the H0 beam. We did this using the chicane magnet bend angles specified in BNL Tech Note #76. Unfortunately, it is not practical to inject into the ring using these bend angles.

RF Systems

Ion Source

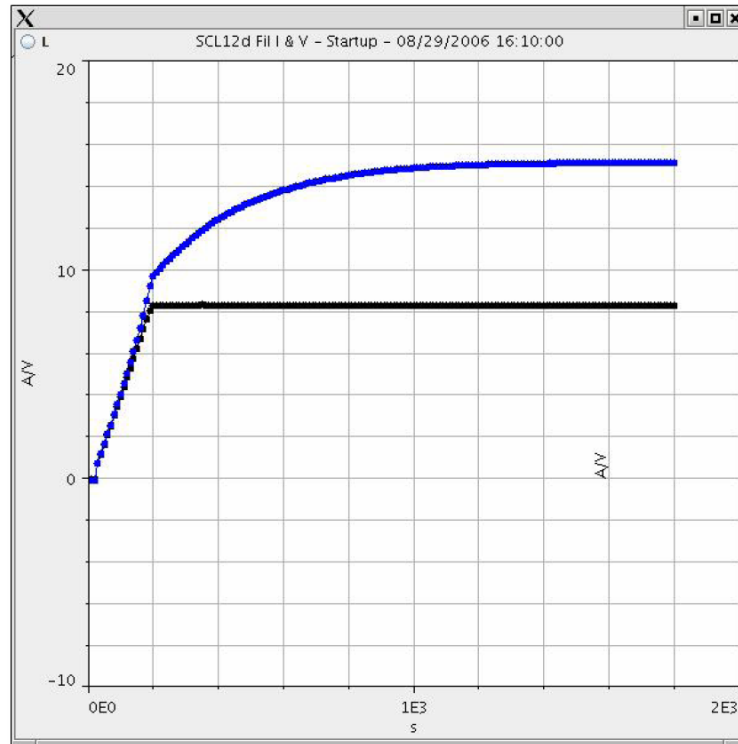
The ion source on the Front end provided the requested beam for the entire 9 week operations period with a single cesiation. Towards the end, the cesium collar temperature

was raised to keep the ion output at the desired level. Also towards the end, the gas flow had to be slightly increased to prevent occasional plasma outages.

- A second cesiation was administered on the last day of operation as a test of the source because its output had dwindled to ~19 mA. After the cesiation was complete, the current slowly increased until reaching ~28 mA. Accordingly, this source never produced more than 28 mA, which could be a source characteristic or caused by prolonged operations with the cesium collar ~180 C.
- The maximum beam size and the maximum convergence of a 5 sigma beam ellipse that meet our 1.79 and 0.0725m/rad Twiss parameter specifications at the face of the RFQ vanes (after being transported un-neutralized through the chopper and RFQ entrance) have been calculated as a function of chopper length and beam current for normalized rms emittance values of 0.2 and 0.35 Pi-mm-mrad.
- Jens Peters visited from DESY which allowed for many detailed discussion on ion source performance and plan for R&D. The DESY source seems to have an emittance that exceeds our emittance by about a factor of 2, although DESY publications have been inconsistent. DESY has installed the emittance scanner on their RF source, and we hope, that Jens can remeasure the emittance for short and long pulses.

Instrumentation and Controls

- The Controls Team entertained two visitors from DESY this week for discussions primarily of MPS issues.
- A team of Oak Ridge High School students preparing for a school-year-long robotics project and competition had their first hands-on lab session in the Diagnostics lab this week.
- The controls team supported the last week of the summer run. The most serious issue was a failure of the new RFQ chiller system, which was discovered to be due to an Allen-Bradley scanner module with incorrect FPGA code – a configuration management failure. An LLRF 'cavity OK' PV was prepared for overview screens, and awaits permission from the SRF task force for installation. At the end of the run, the automated RF shutdown was supported for operator training. A script was also created to graph the filament current and voltage from the data archived during the startup sequence. (Illustration below.)



During the run, beam was used for very successful beam tests of the updated BNL BLM system, which incorporated real-time background subtraction for a 20X improvement in signal-to-noise and did it at 60Hz using only 30% of available CPU time.

The scraper electronics front end is in and tested as far as the current parts on hand allow. Some long-lead items are still awaited. The ADC integrator front end is built and tested and awaits further timing tests.

The EtherIP driver has been configured to run on a "softIOC" and bench tested.

Field cabling and field devices for the RF Test Cave PPS system are 95% complete, and PLC programs were being loaded this week.

Much of the week was devoted to planning and preparations for the September maintenance down time.

Diagnostics

1) Laser System:

a) LDRD laser team successfully provided photons to the experimental area. All systems [cameras, photodiode detectors, and instruments] worked exceptionally well. Dave Thompson and Coles Sibley supported us all along.

b) SCL Laser profile monitor worked well with the exception of station-14. Once again, we lost an amplifier due to the x-rays from the cryo module. Laser itself at times shows power modulations. It is under warranty and the manufacturer is aware of it.

2) BCM System:

A new version of BCM software is installed. It is a lot more accurate in calculation the chopped total charge.

3) BMP Systems:

Heat has become an issue in SCL BPM rack. We are investigating alternative cooling system for that rack.

4) BLM System:

Our collaboration with INR has resulted in a new neutron detector. We tested one on Cryo module 12. The x-ray sensitivity is reduced by a factor of 2 and neutron sensitivity is increased by a factor of three. This prototype is performing well.

5) Misc.

Wire scanners performed well, Faraday cup electronics show sign of aging. In general, all diagnostics worked well during the run.

SRF Facility

SRF Task Force

Survey and Alignment

Target/Experiments:

- Beam line 6: Check shots on the PIP before providing a drawing to that group.
- Beam line 11: Asbuilt upstream-most baseplate and chopper cavity guides. Set shielding block guide in place. Set and asbuilt the downstream bridge assembly.
- Beam line 12: Performed a very detailed mapping campaign: 1-foot grid on the surfaces of the chopper cavity and BL11 steel, as well as locations of the BL12 PIP, the adjacent BL11 PIP, and the bulk shield liner flange.
- Beam line 15: Asbuilt survey of PIP.
- Beam line 16: Re-marked bisectors around this beam line. Performed asbuilt survey of surrounding beamlines. Also, worked with their drawing to derive points to be set out at a

later date for the PIP and cave walls. Set elevation reference points outside of chopper cavity.

- Beam line 18: Set anchor bolt locations with the carpenters as they built forms for columns.
- **Accelerator tunnel system:**
- Refined schedule of work for September shutdown. Moved three laser trackers into the tunnel system for acclimation.

Cryo Systems

Mechanical Systems

Electrical Systems